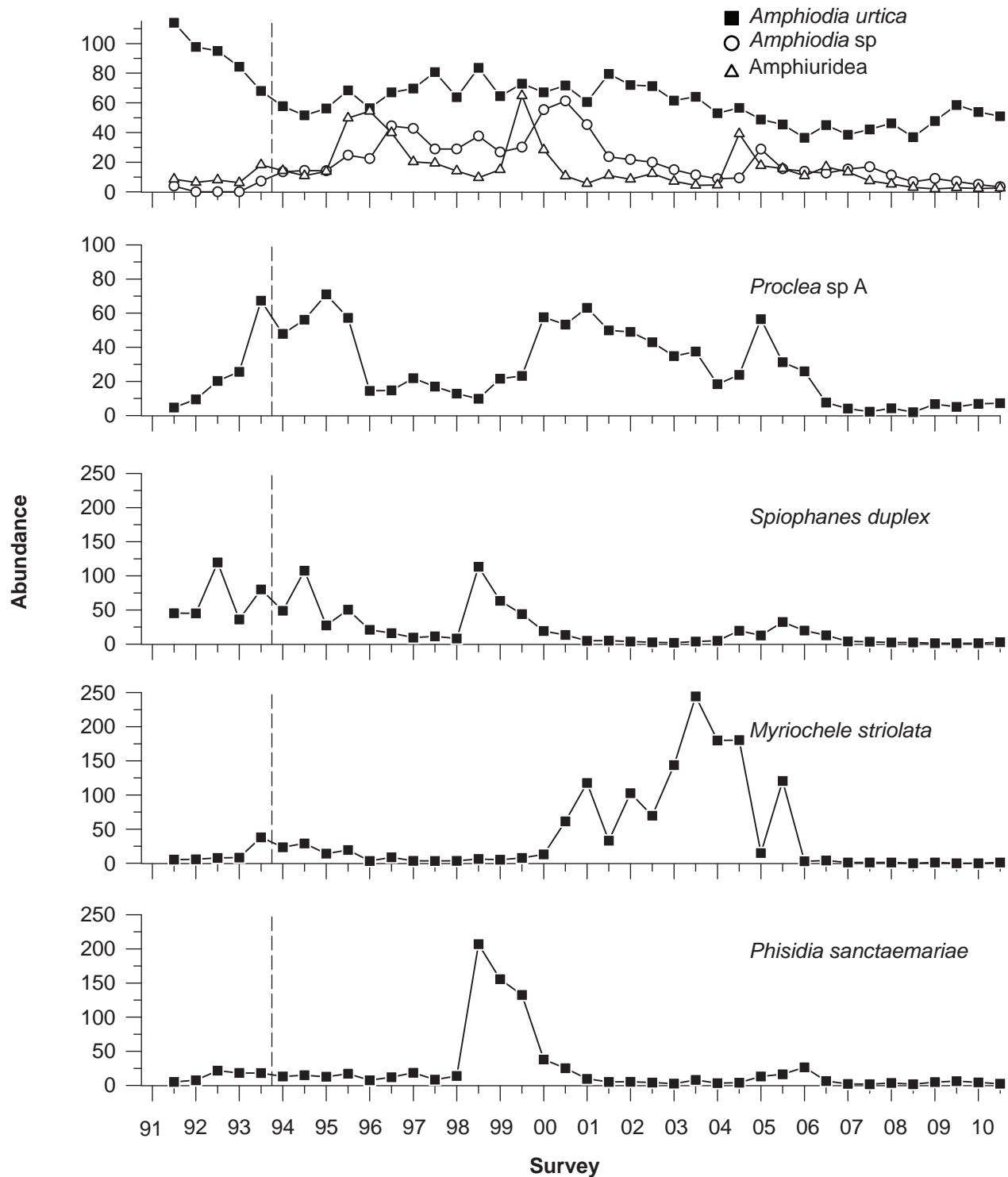


Appendix D

Supporting Data

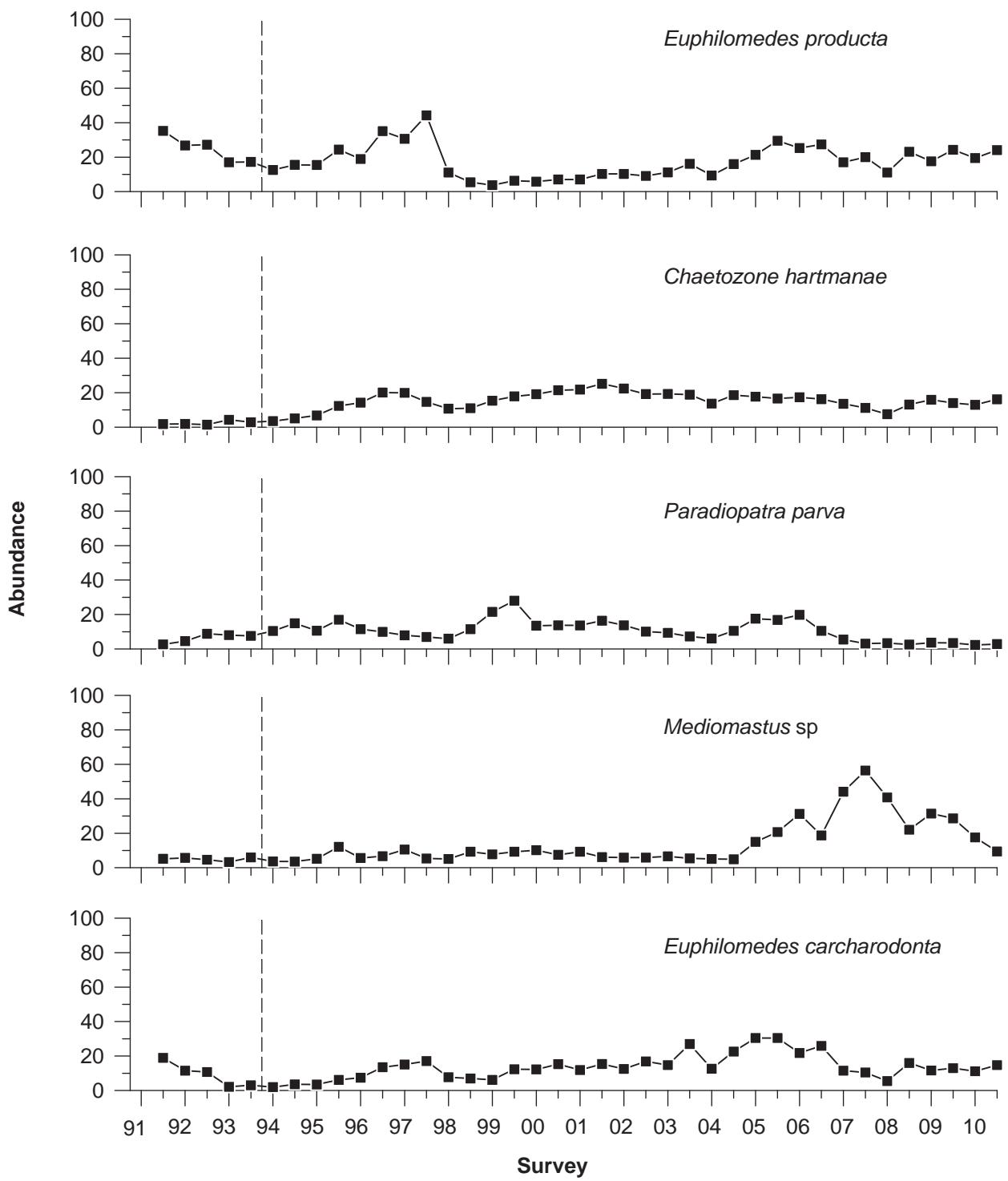
2010 PLOO Stations

Macrobenthic Communities



Appendix D.1

Abundance per survey for each of the 10 most abundant species (taxa) at PLOO benthic stations sampled between 1991 and 2010. Species listed in order of decreasing abundance. *Amphiodia urtica* and unidentifiable juveniles (*Amphiodia* sp and *Amphiuridea*) graphed together; note expanded scale for *Spiophanes duplex*, *Myriochele striolata*, and *Phisidia sanctaemariae*. Data are expressed as mean values of biannual (i.e., first and third quarters) samples during each survey ($n=22$); sampling was limited to primary core stations ($n=12$) during the quarters 03-3, 04-3, 05-1, 08-3, and 09-1 due to regulatory relief to accommodate special projects. Dashed lines indicate onset of discharge from the PLOO.



Appendix D.1 *continued*

Appendix D.2

Abundance (# individuals/0.1-m²) of common organisms within groups defined by cluster analysis (Figure 5.4). Data are expressed as means ± SE. Colored boxes provide partial explanation of SIMPROF support for each clade. Gray shaded boxes show abundances of select invertebrates that occurred ubiquitously across the PLOO sampling region. Blue shaded boxes indicate the absence of many common taxa from one grab at site E21 in January (cluster group E). Pink boxes indicate high abundances of select organisms at deep sites B12, E3, and E9 (cluster group D). Yellow boxes highlight select species whose abundances at the PLOO (site E14) site differed from other survey sites (cluster group A). Green boxes show high populations of the ophiuroid *Amphiodia urtica* at mid-depth sites.

Cluster Group		Number of Grabs									
		E14 Jan (1 grab)	B10 Jan	E9	E2	E8	E14 Jan (1 grab)	E21 Jan (1 grab)	B12	E3 Jan, E9 Jan	
Annelida (Polychaeta)											
<i>Aphelochaeta glandaria</i> Cmplx	18.33 (9.96)	28.5 (0.5)	1.75 (1.03)	10 (4)	1.5 (0.29)	2 (1)	1 (1)	4 (0.79)	7.04 (0.48)	1.25 (0.48)	3 (1.08)
<i>Aphelochaeta</i> sp LA1	2 (0.58)	6 (2)	8.5 (2.10)	5.5 (1.5)	2 (1.68)	3.5 (1.5)	7.75 (2.25)	1 (0.40)	2.34 (0.25)	2.75 (0.63)	1 (2.22)
<i>Aricidea (Acmira) catherinae</i>	3 (0.58)	2.5 (2.5)	1.75 (1.03)	13.5 (2.5)	6.5 (1.5)	39.5 (18.5)	12.5 (3.77)	36 (1.19)	8.53 (0.25)	2 (0.41)	1 (4.71)
<i>Chaetozone hartmanae</i>	13 (3.21)	5.5 (1.5)	14.25 (2.10)	8.5 (5.5)	14.5 (2.60)	8.5 (2.5)	7 (1.22)	15 (0.84)	7.60 (0.41)	1 (0.71)	4 (0.71)
<i>Lumbrineris</i> sp Group I	2 (0.58)	1 (0)	0.25 (0.25)	0.5 (0)	4 (0.5)	10.5 (0.5)	12.25 (2.25)	9 (0.83)	5.68 (0.58)	1 (1.44)	7 (0.25)
<i>Lysippe</i> sp A	2.67 (1.45)	0.5 (0.5)	3.25 (1.31)	3 (2)	3.5 (0.96)	18.5 (3.5)	6.5 (1.55)	5 (0.50)	4.79 (1.03)	2.75 (0.75)	7 (14.5)
<i>Prionospio (Prionospio) jubata</i>	1.33 (0.88)	6.5 (0.5)	2.25 (0.63)	1.5 (0.5)	1.5 (0.65)	1.5 (0.5)	2.25 (0.5)	2 (0.32)	2.98 (6.04)	7 (0.75)	3 (3.19)
<i>Sternaspis fessor</i>	1 (0.58)	3 (1)	4 (1.91)	8.5 (2.5)	2.5 (0.87)	3 (0.41)	2 (0.41)	6 (1.55)	5.36 (1.08)	4 (0.48)	6 (0.75)
Arthropoda											
<i>Caecognathia crenulatifrons</i>	2 (1.15)	4 (2)	1.5 (0.65)	6 (3)	5 (1.47)	2 (0)	1.25 (0.75)	5 (0.56)	4.32 (0.41)	1 (0.41)	1 (4.5)
Annelida (Polychaeta)											
<i>Aphelochaeta monilaris</i>	10 (1.53)	11.5 (1.5)	2.25 (0.25)	22.5 (1.5)	1.5 (0.65)	3 (2)	2 (1.35)	2 (0.42)	2.87 (0.48)	1.5 (0.65)	0 (0.25)
<i>Clymenura gracilis</i>	2 (1.15)	0.5 (0.5)	3 (0.71)	1 (1)	3.5 (0.65)	1.5 (1.38)	5.25 (0.35)	1 (3.19)	5.25 (1.58)	0 (0.48)	0 (0.75)
<i>Prionospio (Prionospio) dubia</i>	4 (0.58)	1 (1)	5 (1.35)	4 (0)	2.25 (0.48)	4 (2)	9.5 (1.19)	2 (0.48)	4.62 (1.55)	5.5 (1.26)	0 (1.03)
Arthropoda											
<i>Ampelisca pugetica</i>	2 (0)	2 (1)	6 (1.78)	1 (1)	3.75 (1.93)	2 (1)	0.75 (0.75)	3 (0.20)	1.43 (0.25)	0.75 (0.29)	0 (1.03)

Appendix D.2 *continued*

Mollusca																
Axonopsida serricata	6.67 (3.53)	15.5 (1.5)	31.5 (6.08)	39 (1)	23.5 (4.73)	0.5 (0.5)	1.5 (0.29)	15 (2.14)	9 (1.03)	28.25 (10.19)	1.5 (0.5)	0 (4.01)	9.75 (0)	1 (0.41)	1 (0.41)	
Ennucula tenuis	0.33 (0.33)	1.5 (1.5)	6 (1.15)	1.5 (1.5)	1.5 (0.87)	4.5 (2.5)	7.5 (0.32)	2 (0.37)	3.40 (1.49)	4.25 (1.44)	11.25 (1.03)	0 (0.25)	0.25 (0.25)	3 (1)	2.75 (1.44)	
Annelida (Polychaeta)																
Aricidea (Acmira) lopezi	0	0	0.25 (0.25)	0	1.25 (1.25)	1	0	0	5.09 (1.03)	0.25 (0.25)	2.25 (1.44)	0	3.75 (1.89)	0	14.75 (4.82)	
Mollusca																
<i>Micranellum crebricinctum</i>	0	0	0	0	0	0	0	0	0	0	0	0	13.75 (1.49)	1.5 (1.5)	2.5 (1.5)	
Annelida (Polychaeta)																
<i>Capitella teleta</i>	15.33 (3.28)	0	0.25 (0.25)	0	0	0	0.25 (0.25)	26	0.36 (0.12)	0	0	0	0.25 (0.25)	0	0	0
<i>Notomastus</i> sp A	27.33 (7.31)	1.5 (1.5)	1 (0.41)	0.5 (0.5)	0	1.5 (0.5)	1 (0.71)	0	0.26 (0.07)	0	0.25 (0.25)	0	0.75 (0.48)	1 (0.48)	1 (0.48)	1.25 (0.48)
<i>Polycirrus californicus</i>	0	0	0	0	0	0	0	0	0.28 (0.19)	0	0	0	0	0	0	0.25 (0.25)
<i>Polycirrus</i> sp A	6 (4.16)	0	4.25 (0.63)	36.5 (12.5)	12.25 (2.72)	1.5 (0.5)	9.25 (1.75)	32	10.72 (1.44)	2.25 (1.11)	5.25 (0.95)	8	7.25 (3.86)	13 (1)	13 (1.44)	6.25 (1.44)
<i>Polycirrus</i> sp I	0	0	0.5 (0.5)	1.5 (0.5)	0	0.5 (0.5)	0	0	0.13 (0.05)	0	0	0	0.25 (0.25)	0	0	0.25 (0.25)
<i>Polycirrus</i> sp OC1	6.3 (0.88)	8.5 (8.5)	0.75 (0.75)	0	0	0	0	0	2.50 (0.99)	0	0.5 (0.5)	0	0.25 (0.25)	1	1 (0.25)	1 (0.25)
<i>Polycirrus</i> sp	40.33 (19.80)	9 (1)	4.75 (0.85)	0	2.25 (1.44)	16.5 (3.5)	9.5 (5.74)	8	2.83 (0.69)	1 (0.58)	0.25 (0.25)	0	0.25 (0.25)	1 (0.41)	1 (0)	0
Arthropoda																
<i>Ampelisca pacifica</i>	1.33 (0.88)	5.5 (2.5)	3 (1.22)	3.5 (0.5)	5 (0.71)	4.5 (1.5)	3.25 (1.44)	0	4.81 (0.52)	7 (2.12)	2.75 (0.85)	2	2 (0.41)	3 (0.75)	3 (0.75)	3.25 (0.75)
<i>Eyakia robusta</i>	0	2 (0)	1.5 (0.65)	2 (2)	4 (0.41)	3 (0)	1.75 (0.25)	0	1.51 (0.27)	4.25 (0.95)	2 (1.22)	0	1.75 (0.63)	1 (0.63)	1 (0.63)	1.5 (0.29)
Echinodermata																
<i>Amphiodia digitata</i>	0	3 (2)	0.25 (0.25)	2 (0)	0.75 (0.48)	9.5 (0.5)	1.25 (0.48)	0	0.40 (0.10)	0.25 (0.25)	0.25 (0.25)	0	8.25 (2.56)	15.5 (5.5)	12.25 (2.02)	12.25 (2.02)
<i>Amphiodia urtica</i>	0	1.5 (0.5)	4.75 (1.44)	3.5 (0.5)	15.75 (2.43)	7.5 (1.5)	42.5 (3.77)	8	27.89 (2.11)	56.25 (5.31)	95.75 (4.48)	14	1.75 (1.03)	5.5 (1.5)	4.5 (2.53)	4.5 (2.53)

Appendix D.3

Summary of taxa that distinguish between cluster groups according to SIMPER analysis. Shown are the five taxa with the greatest percent contribution to overall average Bray-Curtis dissimilarity between each group.

Species/Taxa	Average Dissimilarity/ Standard Deviation	Percent Contribution	Cumulative Percent Contribution
Groups A & B			
<i>Notomastus</i> sp A	0.37	1.68	1.68
<i>Capitella teleta</i>	0.18	1.54	3.23
<i>Polycirrus</i> sp	0.37	1.52	4.75
<i>Euclymeninae</i>	0.24	1.36	6.11
<i>Euclymeninae</i> sp A	0.09	1.26	7.37
Groups A & C			
<i>Adontorhina cyclia</i>	0.20	1.79	1.79
<i>Decamastus gracilis</i>	0.39	1.72	3.51
<i>Notomastus</i> sp A	0.33	1.72	5.23
<i>Polycirrus</i> sp	0.56	1.65	6.88
<i>Chloeia pinnata</i>	0.62	1.5	8.38
Groups A & D			
<i>Polycirrus</i> sp	0.84	1.95	1.95
<i>Notomastus</i> sp A	0.34	1.7	3.65
<i>Capitella teleta</i>	0.19	1.49	5.14
<i>Euclymeninae</i>	0.23	1.47	6.61
<i>Chloeia pinnata</i>	0.59	1.35	7.96
Groups A & E			
<i>Polycirrus</i> sp	1.30	2.41	2.41
<i>Notomastus</i> sp A	0.42	2.26	4.66
<i>Chloeia pinnata</i>	1.23	1.78	6.44
<i>Decamastus gracilis</i>	0.52	1.75	8.19
<i>Euclymeninae</i>	0.29	1.73	9.92
Groups A & F			
<i>Amphiodia urtica</i>	0.41	1.97	1.97
<i>Notomastus</i> sp A	0.32	1.92	3.89
<i>Polycirrus</i> sp	0.77	1.87	5.76
<i>Decamastus gracilis</i>	0.45	1.55	7.3
<i>Chloeia pinnata</i>	0.68	1.47	8.78
Groups A & G			
<i>Amphiodia urtica</i>	0.44	3.49	3.49
<i>Polycirrus</i> sp	0.97	2.03	5.51
<i>Notomastus</i> sp A	0.34	2.01	7.52
<i>Decamastus gracilis</i>	0.41	1.94	9.47
<i>Chloeia pinnata</i>	0.90	1.61	11.07
Groups B & C			
<i>Aphelochaeta glandaria</i> Cmplx	0.30	2.01	2.01

Appendix D.3 *continued*

Species/Taxa	Average Dissimilarity/ Standard Deviation	Percent Contribution	Cumulative Percent Contribution
Groups B & C			
<i>Adontorhina cyclia</i>	0.25	1.56	3.57
<i>Aricidea (Acmira) rubra</i>	0.04	1.51	5.08
<i>Chaetozone sp SD5</i>	0.08	1.33	6.41
<i>Polycirrus sp A</i>	0.08	0.93	7.34
Groups B & D			
<i>Aricidea (Acmira) rubra</i>	0.04	1.71	1.71
<i>Aphelochaeta glandaria Cmplx</i>	0.24	1.69	3.4
<i>Polycirrus sp A</i>	0.38	1.34	4.74
<i>Aphelochaeta monilaris</i>	0.20	1.26	6
<i>Polycirrus sp</i>	0.30	1.25	7.24
Groups B & E			
<i>Axinopsida serricata</i>	0.02	2.21	2.21
<i>Aphelochaeta glandaria Cmplx</i>	0.09	2.03	4.25
<i>Aphelochaeta monilaris</i>	0.02	1.9	6.15
<i>Aricidea (Acmira) rubra</i>	0.02	1.86	8.01
<i>Polycirrus sp</i>	0.20	1.7	9.71
Groups B & F			
<i>Amphiodia urtica</i>	0.49	1.93	1.93
<i>Aphelochaeta glandaria Cmplx</i>	0.42	1.65	3.58
<i>Aricidea (Acmira) rubra</i>	0.20	1.6	5.18
<i>Polycirrus sp A</i>	0.52	1.52	6.71
<i>Chaetozone sp SD5</i>	0.11	1.49	8.19
Groups B & G			
<i>Amphiodia urtica</i>	0.57	3.77	3.77
<i>Aphelochaeta glandaria Cmplx</i>	0.26	2.31	6.08
<i>Aricidea (Acmira) rubra</i>	0.04	1.67	7.75
<i>Chaetozone sp SD5</i>	0.09	1.48	9.23
<i>Chloeia pinnata</i>	0.12	1.41	10.63
Groups C & D			
<i>Adontorhina cyclia</i>	0.33	2.03	2.03
<i>Axinopsida serricata</i>	0.53	1.9	3.93
<i>Amphiodia digitata</i>	0.32	1.47	5.4
<i>Chaetozone hartmanae</i>	0.28	1.28	6.68
<i>Euphilomedes producta</i>	0.33	1.05	7.73
Groups C & E			
<i>Axinopsida serricata</i>	0.49	3.02	3.02
<i>Adontorhina cyclia</i>	0.32	2.6	5.62
<i>Ennucula tenuis</i>	0.19	1.31	6.93

Appendix D.3 *continued*

Species/Taxa	Average Dissimilarity/ Standard Deviation	Percent Contribution	Cumulative Percent Contribution
Groups C & E			
<i>Lumbrineris</i> sp Group I	0.19	1.3	8.23
<i>Ampelisca pugetica</i>	0.31	1.3	9.53
Groups C & F			
<i>Adontorhina cyclia</i>	0.51	1.81	1.81
<i>Axinopsida serricata</i>	0.56	1.73	3.54
<i>Euphilomedes producta</i>	0.43	1.57	5.11
<i>Amphiodia urtica</i>	0.48	1.46	6.57
<i>Aricidea (Acmira) catherinae</i>	0.47	1.05	7.62
Groups C & G			
<i>Amphiodia urtica</i>	0.56	3.56	3.56
<i>Axinopsida serricata</i>	0.65	1.7	5.26
<i>Chaetozone hartmanae</i>	0.29	1.61	6.86
<i>Adontorhina cyclia</i>	0.75	1.4	8.26
<i>Rhepoxyinius bicuspidatus</i>	0.18	1.06	9.33
Groups D & E			
<i>Amphiodia digitata</i>	0.44	2.08	2.08
<i>Amphiodia urtica</i>	0.53	1.42	3.5
<i>Aricidea (Acmira) lopezi</i>	0.79	1.36	4.86
<i>Micranellum crebricinctum</i>	0.70	1.33	6.19
<i>Chloeia pinnata</i>	0.74	1.25	7.44
Groups D & F			
<i>Amphiodia urtica</i>	0.61	1.95	1.95
<i>Amphiodia digitata</i>	0.39	1.57	3.52
<i>Micranellum crebricinctum</i>	0.52	1.18	4.7
<i>Monticellina siblina</i>	0.63	1.17	5.86
<i>Aricidea (Acmira) lopezi</i>	0.52	1.11	6.97
Groups D & G			
<i>Amphiodia urtica</i>	0.71	4.09	4.09
<i>Amphiodia digitata</i>	0.41	1.72	5.81
<i>Monticellina siblina</i>	0.73	1.4	7.21
<i>Adontorhina cyclia</i>	0.73	1.34	8.55
<i>Axinopsida serricata</i>	0.74	1.29	9.84
Groups E & F			
<i>Axinopsida serricata</i>	0.92	1.83	1.83
<i>Prionospio (Prionospio) dubia</i>	0.39	1.49	3.32
<i>Praxillella pacifica</i>	0.53	1.47	4.79
<i>Aricidea (Acmira) catherinae</i>	0.58	1.46	6.25
<i>Lumbrineris cruzensis</i>	0.73	1.3	7.55

Appendix D.3 *continued*

Species/Taxa	Average Dissimilarity/ Standard Deviation	Percent Contribution	Cumulative Percent Contribution
Groups E & G			
<i>Amphiodia urtica</i>	0.77	3.95	3.95
<i>Axinopsida serricata</i>	1.26	2.4	6.34
<i>Ennucula tenuis</i>	0.51	2.14	8.48
<i>Mediomastus</i> sp	0.43	2.1	10.59
<i>Adontorhina cyclia</i>	1.24	1.94	12.53
Groups F & G			
<i>Amphiodia urtica</i>	0.71	2.52	2.52
<i>Euphilomedes producta</i>	0.54	2	4.52
<i>Axinopsida serricata</i>	0.75	1.67	6.19
<i>Adontorhina cyclia</i>	0.73	1.57	7.76
<i>Euphilomedes carcharodonta</i>	0.52	1.46	9.22